Scotland's Biocapacity – A Preliminary Assessment

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Nicola Horsburgh, University of Stirling
Andrew Tyler, University of Stirling
Scot Mathieson, Scottish Environment Protection Agency
Mathis Wackernagel and David Lin, Global Footprint Network

Summary

Results from this preliminary study indicate that Scotland's biocapacity, as calculated predominantly with 2018 data, is in the range of 3.3 to 3.9 global hectares per person, with an average value of 3.6 gha per person.

In contrast, the average global biocapacity is approximately 1.6 gha per person, while the UK average biocapacity is 1.1 gha per person, for 2016 (Global Footprint Network 2019).

For this study, Scotland's Ecological Footprint is assumed to be 4.4 gha per person, the same as that of the wider UK for 2016. It follows that Scotland is currently operating with a slight biocapacity deficit of approximately 0.8 gha per person. In contrast, the UK wide biocapacity deficit is currently approximately 3.3 gha per person.

With Scotland's large share of renewable energy and its slightly lower GDP per person, its Ecological Footprint may indeed be smaller than that of the UK, which could mean Scotland is operating with a biocapacity reserve. However, with Scottish winters colder than the UK average, Scotland may have larger energy demand than the UK average.

Future work is therefore needed to calculate Scotland's Ecological Footprint and to narrow the range of Scotland's biocapacity calculation, as this will improve the estimate of Scotland's biocapacity deficit or reserve.

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1. Introduction

Why Ecological Footprint Accounting?

Arguably the most limiting factor for the human economic system is the biosphere's ability to meet our ever-increasing material demands. The overarching limitation is the biosphere's regenerative ability. Examples of human demands placed on the biosphere include fisheries, food production, timber, carbon sequestration, and divergence of freshwater for domestic and industrial uses. A growing global population, coupled with the impacts of climate change, are likely to intensify these demands and lead to significant future resource constraints.

However, the biosphere's regenerative capacity constrains all material flows, not just that of biological materials. For example, the use of fossil fuel is dependent on the biosphere's ability to absorb greenhouse gas emissions, which is at present more limiting than the amount of fossil fuel reserves left in the ground. Similarly, access to minerals and metals is limited by the energy needed to extract ores and concentrate them.

Most would agree that an aircraft without a fuel gauge poses a risk. Similarly, to govern a region without knowing how much people demand from the biologically productive surfaces (the Ecological Footprint), and how much the region's productive surfaces can regenerate (biocapacity), poses a risk to resource security. To provide a future in which citizens can thrive, decision makers need to understand society's demand on the planet's biologically productive surfaces. This knowledge is vital to support investment decisions in urban infrastructure, energy sources, agriculture and sustainable development goals (Wackernagel et al. 2019). But how much do people take compared to what is available? To find the answer, we need metrics.

Principles of Ecological Footprint Accounting

The Ecological Footprint is a measure of the biologically productive land and water area an individual, population or activity requires to produce all the resources it consumes, accommodate its urban infrastructure, and absorb the waste it generates. Biocapacity is a measure of the amount of biologically productive land and water area available to meet those demands. By subtracting the Ecological Footprint from the available biocapacity, one can find whether the region is operating with an ecological deficit, where demand exceeds supply, or an ecological reserve, where the demands on the biosphere are within the region's regenerative capacity.

To compare and add up the demand and capacity of different land use types, both biocapacity and Ecological Footprint are expressed in the unit of global hectares [gha], defined as biologically productive hectares with world average productivity. The conversion from hectares to global hectares is achieved by scaling the physical area associated with a certain land use type by its productivity relative to world average productivity.

The most common assessment is at the national level. The National Footprint and Biocapacity Accounts (NFA) is based on up to 15,000 data points per country and per year from United Nations statistics. The NFA is calculated annually for more than 200 countries, territories, and regions, and cover from 1961 to the present. The newest data, based on those accounts (up to 2016), and extended through nowcasting to 2020 using supplementary data, show that human demand in 2020 may exceed the planet's biocapacity by 56% (https://www.overshootday.org/2020-calculation). This means we are using resources at a faster rate than the planet can renew them. To use an economic metaphor, we are liquidating our natural assets and no longer living off the interest. For a discussion on the economic implications of resource security, see Wackernagel et al. (2019). Country trends and national reviews are available at http://data.footprintnetwork.org. Details about the principles and mechanics of this accounting system are documented extensively in the literature (Borucke et al. 2013; Lin et al. 2018) including the latest working guidebook to the NFA (Lin et al. 2019). More open-access papers are available at https://www.footprintnetwork.org/resources/data/.

Why Assess Scotland's Biocapacity?

To our knowledge, there is no full assessment for Scotland that systematically tracks both its Ecological Footprint and biocapacity. As consumption patterns in Scotland may not differ greatly from the rest of the UK, one can approximate Scotland's per capita Ecological Footprint as equivalent to that of the UK, as calculated by Global Footprint Network (data up to 2016 available at http://data.footprintnetwork.org). However, Scotland has a wealth of natural resources in the form of inland water, marine fishing grounds and forests, along with a lower population density than the UK average, which gives it more biocapacity per person than the UK average. This report examines, in a preliminary way, the size of Scotland's biocapacity.

2. Assessing Biocapacity - Method

NFA Methodology

Biocapacity is calculated for each of the main land use types: cropland, grazing land, marine and inland fishing grounds, forests, and built-up land. The results are then summed to calculate Scotland's total biocapacity.

Consistent with Global Footprint Network's National Footprint and Biocapacity Accounts methodology, as explained in Borucke et al. (2013) and Lin et al. (2019), the biocapacity of a region is calculated as follows:

$$BC = \sum_i A_{,i} \cdot YF_{,i} \cdot EQF_i$$

Biocapacity (BC) is expressed in global hectares. $A_{,i}$ is the region-specific bioproductive area available for production of product i, measured in hectares. This is calculated from the relevant geospatial data or national statistics for each of the above land use types in Scotland. $YF_{,i}$ is the region-specific yield factor which relates Scottish productivity to the world-average productivity of a given product i, measured in world hectares per hectare. EQF_i is the equivalence factor which relates the productivity of land use i to world average productivity, measured in global hectares per world hectare. Equivalence factors are calculated with a Global Agro-Ecological Zones model and provided by Global Footprint Network for each land use type (Global Footprint Network 2019).

This chapter gives an overview of the data used in Scotland's biocapacity calculation. The areas listed are from reported national statistics and the European Corine Land Cover 2018 programme (European Environment Agency 2018), while yield factors are from national statistics and the literature. Yield factors and biocapacity totals are given in Chapter 3 *Results*. For further details about the calculation of Scotland's biocapacity, comparison with other land classifications, and a sensitivity analysis, refer to *Scotland's Biocapacity – Supplementary document*.

Crop Land

Components of the Crop Land biocapacity calculation include:

- Area [ha]: All arable land and permanent crops
- Yield Factor [wha/ha]:
    - Y_{SCO_CROP} – Average yield of crop production in Scotland
    - Y_{W_CROP} – World average yield of the crops grown in Scotland
- $EQF_{\_CROP}$ [gha/wha]: Crop land equivalence factor

Crop Area

Scotland's crop land area	573,850 ha

Crop area is defined as the total Scottish land area dedicated to arable land and permanent crops, including fallow and set-aside land, as reported in the June 2018 Agricultural Census for Scotland (The Scottish Government 2018). This aligns the calculation with the latest 2018 United Nations world crop production data.

Crop Yield Factor

Y_{SCO_CROP}	8.76 t ha^{-1} yr^{-1}
Y_{W_CROP}	3.91 t wha^{-1} yr^{-1}

To calculate the average yield of all crops grown in Scotland (Y_{SCO_CROP}), the latest available crop production data from the Scottish Government's Agricultural Statistics (2018) and harvested area data from the Scottish Agricultural Census (2018) were used. The average national yield is calculated by dividing the total Scottish crop production by the total harvested land area in Scotland. The corresponding world average yield (Y_{W_CROP}) is calculated by dividing the total Scottish crop production by the total harvested area, scaled by world average productivity. The ratio of these two figures gives the yield factor for Scottish crop land, which describes the productivity of Scottish crops, relative to the world average productivity of those crops. See Table 1.

World crop production data for 2018 was obtained from the United Nations Food and Agriculture Organization (United Nations 2020), and used to calculate the world average productivity of each crop grown in Scotland.

Crop EQF

$EQF_{\_CROP}$	2.50 gha wha^{-1}

Equivalence factors are provided by Global Footprint Network (2019) and are calculated by overlapping data of the Global Agro-Ecological Zones (GAEZ) model with land-use categories. The GAEZ model uses the concept of agricultural suitability to evaluate the relative productivity of land areas.

Grazing Land

Components of the Grazing Land biocapacity calculation include:

- Area [ha]: Improved and unimproved grassland
- Yield Factor [wha/ha]:
    - Y_{SCO_I} – Average yield of improved grassland in Scotland
    - Y_{SCO_U} – Average yield of unimproved grassland in Scotland
    - Y_{W_GRA} – World average yield of grazing land
- $EQF_{\_GRA}$ [gha/wha]: Grazing land equivalence factor

Grazing Area

Scotland's improved grassland area	1,212,891 ha
Scotland's unimproved grassland area	757,485 ha

Grazing land is typically divided into areas of improved grassland, defined as permanent grassland, *characterized by strong human influence, typically used for grazing pastures or mechanical harvesting of grass meadows*; and unimproved grassland, defined as *low productivity grasslands under little or no human influence* (European Environment Agency 2018). Due to the differences in productivity between these two types of grassland, the Grazing Land biocapacity calculation was separated into improved and unimproved grassland sub-categories.

The total Scottish land area dedicated to pastures (class 231) and natural grassland (class 321) of the European Corine Land Cover 2018 programme (European Environment Agency 2018), was extracted in a Geographical Information System for this part of the calculation.

Grazing Yield Factor

Y_{SCO_I}	10 t DM ha^{-1} yr^{-1}
Y_{SCO_U}	3 t DM ha^{-1} yr^{-1}
Y_{W_GRA}	6.19 t DM wha^{-1} yr^{-1}

According to NFA methodology, grazing land yield is defined as the average above-ground net primary production for grassland, measured in tonnes of dry matter per hectare per year [t DM ha^{-1} $yr^{-1]}$. This is influenced by temperature, sunlight, soil moisture and soil nitrogen levels (Gimona et al. 2006). Yields for improved and unimproved grasslands of 10 and 3 t DM ha^{-1} yr^{-1} respectively were used in the calculation, as provided by the Scottish Rural Development Programme (Beattie 2019). Improved grassland yield was compared with values for Scotland from the literature (Gimona et al. 2006) and found to differ by less than 1%.

The ratio of each of the grassland yields (Y_{SCO_I} and Y_{SCO_U}) to the world average grassland yield ($Y_{W\_GRA,}$ as estimated by Global Footprint Network (2019)) gives the yield factor for each. See Table 1.

Grazing EQF

$EQF_{\_GRA}$	0.46 gha wha^{-1}

Equivalence factors are provided by Global Footprint Network (2019) and are calculated by overlapping data of the Global Agro-Ecological Zones (GAEZ) model with land-use categories. The GAEZ model uses the concept of agricultural suitability to evaluate the relative productivity of land areas.

Marine Fishing Grounds

Components of the Marine Fishing Grounds biocapacity calculation include:

- Area [ha]: Scotland's shelf sea area
- Yield Factor [wha ha^{-1}]:
  - Y_{SCO_MAR} – Average rate of marine net primary production in Scottish shelf seas
  - Y_{W_MAR} – Average rate of marine net primary production in global continental shelf seas
- $EQF_{\_MAR}$ [gha wha^{-1}]: Marine fishing grounds equivalence factor

Marine Area

Scotland's shelf sea area	25,143,100 ha

Shelf seas are the shallow regions on the continental shelf, typically less than 200m deep, between the shore and deep ocean. These seas cover only about 9% of the global ocean area (Harris et al. 2014), but are highly productive and support approximately 90% of global fisheries (Kröger et al. 2018). NFA methodology therefore defines bioproductive marine area as the shelf sea area, as opposed to a country's entire Exclusive Economic Zone (EEZ) which extends 200 nautical miles from the shore and consists of both shelf sea and deep ocean.

Data from Scotland's Marine Atlas (Baxter 2011) and Sea Around Us (2020) was used to calculate the area of Scotland's shelf seas, and results were cross checked in a Geographical Information System with alternative datasets and found to differ by less than 2%. Results show that Scotland's shelf seas cover 25,143,100 ha, which is nearly half of the entire UK shelf sea area.

Marine Yield Factor

Y_{SCO_MAR}	356 mgC m^{-2} day^{-1}
Y_{W_MAR}	504 mgC m^{-2} day^{-1}

Phytoplankton are microscopic photosynthesising organisms which live in the upper sunlit layers of the ocean. They are responsible for marine primary production, which is the synthesis of organic compounds from dissolved carbon dioxide via chlorophyll and light. Phytoplankton sustains most marine food webs (including those supporting species harvested by commercial fisheries) and their productivity provides a powerful indicator of the ocean's regenerative capacity (Tett et al. 2013). The yield of marine fishing grounds Y_{SCO_MAR} is therefore defined by NFA methodology as the average rate of phytoplankton net primary production (NPP).

Phytoplankton primary production dynamics are complex, as photosynthesis varies with seasons and locations, as well as between years. Simulations using specialist ecosystem models can therefore provide more accurate results than discrete measurements. Scottish shelf sea NPP estimates were obtained from the latest European Regional Seas Ecosystem Model which simulate the seasonal interactions of light, temperature, water mixing and how these impact phytoplankton primary production. Simulations were conducted by the National Oceanography Centre and the Scottish Marine Institute (Holt et al. 2016; Tett et al. 2013) with average Scottish marine NPP estimated to be in the region of 356 mgC m^{-2} day^{-1}.

According to Global Footprint Network accounting methodology, the ratio of Scottish to global marine shelf sea NPP gives the yield factor for Scottish marine fishing grounds. In this, the value for global marine shelf sea NPP is estimated from the level of NPP required to sustain the current specified levels of sustainable fish harvest. This is estimated by Global Footprint Network (through the Sea Around Us project (Global Footprint Network 2019)), to be 504 mgC m^{-2} day^{-1}.

Marine EQF

$EQF_{\_MAR}$	0.37 gha wha^{-1}

Equivalence factors are provided by Global Footprint Network (2019) and are calculated by overlapping data of the Global Agro-Ecological Zones (GAEZ) model with land-use categories. The GAEZ model uses the concept of agricultural suitability to evaluate the relative productivity of land areas. In the case of ocean areas, the equivalence is calculated via animal protein production.

Inland Fishing Grounds

Components of the Inland Fishing Grounds biocapacity calculation include:

- Area [ha]: Total fresh water inland area, including water bodies and water courses
- Yield Factor [wha ha^{-1}]: 1
- $EQF_{\_INL}$ [gha wha^{-1}]: Inland fishing grounds equivalence factor

Inland Fishing Area

Total fresh water inland area	121,055 ha

Like the marine fishing grounds calculation, the bioproductive area of inland fishing grounds is estimated as all inland water areas capable of primary production which sustains the food webs which harvested species depend on. In Scotland, freshwater primary production is driven by phytoplankton and phytobenthos present in lochs and rivers. To this end, the land area of all inland fresh water courses (class 511) and water bodies (class 512) was extracted from the European Corine Land Cover 2018 programme (European Environment Agency 2018), with a total of 121,055 ha.

Inland Fishing Yield Factor

Inland fishing grounds Yield Factor	1

Due to the lack of data on the productivity of global inland waters to date, country-specific yield factors cannot be calculated, and Global Footprint Network treats all inland waters as equally productive with a yield factor of 1 (Borucke et al. 2013).

Inland Fishing EQF

$EQF_{\_INL}$	0.37 gha wha^{-1}

Equivalence factors are provided by Global Footprint Network (2019). Due to the lack of data on the productivity of global inland waters, Global Footprint Network assigns the equivalence factor of marine fishing grounds to inland fishing grounds (Borucke et al. 2013).

Forest Land

Components of the Forest Land biocapacity calculation include:

- Area [ha]: Total coniferous and broadleaf forest land use area
- Yield Factor [wha ha^{-1}]:
    - Y_{SCO_CON} – Average Net Annual Increment of merchantable softwood (coniferous) timber [m^3 ubs ha^{-1} yr^{-1}] for Scotland
    - Y_{SCO_BRO} – Average Net Annual Increment of merchantable hardwood (broadleaf) timber [m^3 ubs ha^{-1} yr^{-1}] for Scotland
    - Y_{W_FOR} – Average Net Annual Increment of merchantable timber [m^3 ubs wha^{-1} yr^{-1}] for the world
- $EQF_{\_FOR}$ [gha wha^{-1}]: Forest land equivalence factor

Forest Areas

Total forest area – coniferous	1,064,000 ha
Total forest area - broadleaf	380,000 ha

Data from the 2018 Forestry Statistics report (Forestry Commission 2018) form part of the National Statistics programme and were used for the AREA component of the Forest Land biocapacity. Two types of forest are distinguished in the statistics, namely coniferous (softwood, mainly plantations, forming nearly 75% of Scotland's forests) and broadleaf (hardwood, mostly in semi-natural woodlands not destined for harvest). Reported areas were cross checked against UK land cover classifications in a Geographic Information System and found to differ by less than 8%.

Forest Yield Factors

Y_{SCO_CON}	8.53 m^3 ubs ha^{-1} yr^{-1}
Y_{SCO_BRO}	2.73 m^3 ubs ha^{-1} yr^{-1}
Y_{W_FOR}	1.82 m^3 ubs ha^{-1} yr^{-1}

The net annual increment (NAI) of timber is used to calculate forest yield. NAI is measured in cubic metres underbark standing per hectare per year and describes how much volume has been added to a forest in each reference period, as opposed to the total standing volume. It therefore describes the regenerative capacity of forests, which makes it a suitable indicator of biocapacity.

Net annual increment is reported as part of the National Forest Inventory (NFI), which forms part of the National Statistics programme. Data from the *25-year Forecast of Softwood Timber Availability* (Forestry Commission 2016) were used to derive coniferous NAI, while data from the *50-year Forecast of Hardwood Availability* (Forestry Commission 2014) were used to derive hardwood NAI. NAI per ha was calculated by dividing reported NAI values by the total forest area, including felled and replanted areas. World average NAI is calculated by the Global Footprint Network to be 1.82 m^3 ubs ha^{-1} yr^{-1} (Global Footprint Network 2019). The ratio of Scottish to world average NAI gives the yield factor for each forest type, as shown in Table 1.

Forest EQF

$EQF_{\_FOR}$	1.28 gha wha^{-1}

Equivalence factors are provided by Global Footprint Network (2019) and are calculated by overlapping data of the Global Agro-Ecological Zones (GAEZ) model with land-use categories. The GAEZ model uses the concept of agricultural suitability to evaluate the relative productivity of land areas.

Built-up Land

Components of the Built-up Land biocapacity calculation include:

- Area [ha]: Total urban and suburban land use area
- Yield Factor [wha ha^{-1}]: Equivalent to Crop Land yield factor
- $EQF_{\_INL}$ [gha wha^{-1}]: Equivalent to Crop Land EQF

Built-up Area

Total urban land area	254,044 ha

The total Scottish land area dedicated to urban and suburban land use (classes 111-142 of the European Corine Land Cover 2018 programme (European Environment Agency 2018)), was extracted in a Geographical Information System for this part of the calculation.

Built-up Yield Factor and EQF

The current line of thought proposed by Global Footprint Network is that because urban developments are often situated near rivers or on fertile land which could otherwise have been used as crop land (Borucke et al. 2013; Lin et al. 2019), urban land is treated as crop land and included in the biocapacity calculation,. This is clearly not always the case and will lead to an overestimation of biocapacity in arid countries. It has also been argued that urban land should not be included in the biocapacity calculation at all, as it is not biologically productive, with the exception of green urban spaces (Kitzes et al. 2009). For consistency, such exclusion would then require built-up land to be removed from the Footprint calculation. However, the current line of thought includes urban land in the biocapacity calculation because some of it is productive, and what is not occupies formerly highly productive land, thereby reflecting forgone biocapacity. For this reason, NFA methodology uses the yield factor and equivalence factor of crop land in the built-up land biocapacity calculation.

3. Results

Yield factor calculations are outlined in Table 1, followed by Scotland's biocapacity calculation (per land use type and total) in Table 2.

Table 1 Yield Factors for Scotland. Due to the difference in productivity, yield factors for improved and unimproved grasslands, and coniferous and broadleaf forests, are calculated separately.

Land Use Type	Yield Descriptor	National Yield	World Yield	Yield Factor
Crop Land	Crop yields [$t\ ha^{-1}\ yr^{-1}$]	8.76	3.91	2.24
Grazing Land - improved	Average above-ground net primary production [$t\ DM\ ha^{-1}\ yr^{-1}$]	10	6.19	1.62
Grazing Land – unimproved	Average above-ground net primary production [$t\ DM\ ha^{-1}\ yr^{-1}$]	3	6.19	0.48
Marine Fishing Grounds	Phytoplankton net primary productivity [$mgC\ m^{-2}\ day^{-1}$]	356	504	0.71
Inland Fishing Grounds	All inland water approximated as equally productive	-	-	1
Forests – coniferous	Net annual increment [$m3\ ubs\ ha^{-1}\ yr^{-1}$]	8.53	1.82	4.69
Forests – broadleaf	Net annual increment [$m3\ ubs\ ha^{-1}\ yr^{-1}$]	2.73	1.82	1.50
Built-up Land	Equivalent to Crop Land	-	-	2.24

Table 2 Scotland's biocapacity – per land type and total. Relevant land areas from Corine 2018 dataset.

Land Use Type	**Area [ha]**	**Yield Factor [$wha\ ha^{-1}$]**	**EQF [$gha\ wha^{-1}$]**	**Biocapacity [gha]**
Crop Land	573,850	2.24	2.50	3,214,310
Grazing Land – improved	1,212,891	1.62	0.46	899,786
Grazing Land - unimproved	757,485	0.48	0.46	168,583
Marine Fishing Grounds	25,143,100	0.71	0.37	6,565,386
Inland Fishing Grounds	121,055	1.00	0.37	44,716
Forests – coniferous	1,064,000	4.69	1.28	6,384,108
Forests - broadleaf	380,000	1.50	1.28	728,692
Built-up Land	254,044	2.24	2.50	1,422,979
TOTAL				**19,428,559**
Population estimate (June 2018)				**5,438,100**
Biocapacity per capita [gha/cap]				**3.57**

The preliminary total for Scotland's biocapacity is 19,428,559 global hectares. With a population estimate of 5,438,100 (as estimated for June 2018 by the National Records of Scotland) Scotland has an estimated biocapacity of 3.57 gha per person. This value is significantly higher than the UK average of 1.1 gha per person, and also higher than the global average of 1.6 gha per person in 2016 (Global Footprint Network 2019). For this study, Scotland's Ecological Footprint is assumed to be 4.4 gha per person, the same as that of the wider UK, as calculated by Global Footprint Network (2019) with 2016 data. It follows that Scotland is currently operating with a slight biocapacity deficit of approximately 0.8 gha per person. In contrast, the UK-wide biocapacity deficit is currently approximately 3.3 gha per person.

Scotland's Biocapacity – Supplementary document describes all data sources and calculation details. The spreadsheet *Scotland_Biocapacity_2020.xlsx* contains a sensitivity analysis of the land types which contribute most to the total biocapacity. It also estimates the range within which Scotland's biocapacity may exist by using the lowest and highest reasonable assumptions for yield and bioproductive area for each of the land types.

4. Implications

Economic Relevance

In a world of climate change and resource constraints, running biocapacity deficits becomes an ever-increasing economic risk - especially to low income nations which are less able to rely on imports. Those risks barely appear in financial analyses because natural capital is still incredibly cheap. But since natural capital is fundamental, inadequate access can threaten economic stability and have significant welfare implications. Recent examples include the 2019 drought in Australia which severely impacted food production, and the drinking water crisis of 2017-2018 in the Western Cape of South Africa. These crises show how a lack of resource security reduces the value of all economic outputs dependent on that resource, resulting in an economic impact which goes beyond the resource's market value.

Conversely, with global resource scarcity increasing, having access to significant amounts of biocapacity becomes a key parameter for long-term economic success. Given Scotland's relatively large biocapacity, there exists a valuable opportunity to secure this natural capital through investment choices which will increase future resource security.

Relevance to Climate

Preparing for a future with climate change and resource constraints also has other benefits. Every country that invests in its own long-term success makes it more likely for other countries to follow. There are several mechanisms which amplify this positive sum game, such as: exchange of information and joint learning; reduction in overall demand on the planet; and building capacity to support others. It becomes a positive-sum game.

In the debate about climate change and greenhouse gas emissions, terms like "climate protection" are often used. However, climate protection is not an accurate description. Like the effort to limit COVID-19, effective climate action is largely about "self-protection". Scotland has recognized this necessity and is decarbonizing aggressively. When considering the current global economic situation following the COVID-19 pandemic, the Green Recovery presents an exciting and vital opportunity to ramp up decarbonisation and align economic recovery with climate action.

Ecological Footprint accounting is a tool which helps countries track these improvements. It allows scientists, policy makers and the public to engage in the debate of how to allocate limited natural resources to best secure wellbeing for all.

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